

REMARKS

Claims 1, 8, 12, 15 and 16 have been amended. Claims 3-5, 7, 9 and 14 have been canceled. Claims 22-24 have been added. Claims 1-2, 6, 8, 10-13, and 15-24 are now pending. A petition for extension of time (two-months) is being filed concurrently herewith. Applicants reserve the right to pursue the original claims and other claims in this and other applications. Applicants respectfully request reconsideration of the above-referenced application in light of the amendments and following remarks.

At the outset, Applicants acknowledge with appreciation that claims 7, 8 and 14-21 are in condition for allowance if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Allowable dependent claim 7 has been rewritten as new independent claim 22. Claim 8 has been amended to depend from the allowable subject matter of new independent claim 22. Allowable dependent claim 14 has been rewritten as new independent claim 24. Claims 15-21 depend from the allowable subject matter of new independent claim 24. Consequently, claims 8, 15-22 and 24 should be in immediate condition for allowance. Applicants also respectfully submit that claims 1-2, 6, 10-13 and 23 should be similarly allowable for at least the following reasons.

Claims 1, 7, 9, 12 and 14 stand objected to for informalities. The rejection is respectfully traversed. Claims 1 and 12 have been amended in accordance with the Office Action's instructions. Specifically, the preamble in claim 1 has been amended to recite, "A non-destructive *inspection* apparatus using a guide wave," and the claim language 'means' recited in claim 12 has been deleted. Claims 7, 9 and 14 have been canceled making the objections moot.

Claims 4 and 9 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The rejection is respectfully traversed. The § 112, second paragraph, rejection is now moot since claims 4 and 9 have been canceled.

Claims 1-3, 5, 6, 12 and 13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,734,588 ("Rose"). The rejection is respectfully traversed.

The cited reference does not disclose the subject matter of amended claims 1 and 12. Specifically, Rose does not teach a nondestructive inspection apparatus using a guide wave comprising, *inter alia*, a "waveform forming means [which] further comprises: means for calculating reception waveforms of said reflection waves when said reflection waves are received by said receiving element; and means for forming the transmission waves in such a manner that said calculated reception waveforms are sequentially transmitted from such a reception waveform in an order of a degree that reception time is late," as recited in claim 1.

Similarly, Rose does not disclose a nondestructive inspection method comprising, *inter alia*, "a step of calculating reception waveforms when an arbitrary waveform propagates as a guided wave for a predetermined distance; [and] a step for forming a transmission waveform so as to transmit said transmission waveform in an order of a degree that reception time is late," as recited in claim 12.

Claims 2 and 6 depend from claim 1 and should be allowable with claim 1 for at least the reasons provided above with regard to claim 1, and on their own merits. Claim 13 depends from claim 12 and should be allowable with claim 12 for at least the reasons provided above with regard to claim 12, and on its own merits.

The present invention provides a laid-pipe inspecting method capable of compensating for the reduction of the amplitude due to the dispersion even for a relatively high frequency band in which the acoustic velocity disperses, and entirely inspecting the defects over the long distant interval. A waveform forming means computes waveforms (the waveforms deformed and reduced in their amplitudes) to be received when an arbitrary waveform is propagated as a guided wave over a specific distance and reflected, and this means forms a transmission waveform by using the computed waveforms to be received so that the computed waveforms to be received can be transmitted in the order opposite to that in which they are to be received. Rose does not disclose or suggest Applicants' waveform forming means.

Rose relates to a method of reducing the attenuation of the guided wave leaked into a liquid when tubes are inspected. The construction is to have ring-shaped elements disposed at certain intervals in the tube in the axial direction so that the guided wave can be adjusted to have a specified phase velocity at a particular point on a dispersion curve of a particular mode. Rose uses a guided wave generating means that can generate a guided wave at any one of several parameters of phase velocity and so on by using transducer elements. Rose supplies a wave of a particular frequency from the generating means to the elements disposed at certain intervals in the axial direction of the pipe, so that only the component having a specific phase velocity can be emphasized, transmitted and received. The effect is that the guided wave to be transmitted and received can be limited to a mode/frequency at which the attenuation due to the leakage into liquid is small.

According to the present invention, when the transmission waveform is transmitted as a guided wave from the transmitter, the waves reflected from particular distances are received with high amplitudes (the deformed waveforms are reversely restored into the original signals) at the location of the receiver. Thus, the present

invention is able to sensitively detect a very small reduction of the thickness of the pipe wall.

Claims 10 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Rose in view of U.S. Patent No. 6,578,422 ("Lam"). The rejection is respectfully traversed.

Claims 10 and 11 depend from amended claim 1 and should be allowable with amended claim 1 for at least the reasons provided above with regard to amended claim 1, and on their own merits. Moreover, Lam relates to detecting defects near the end of a tubular member. Lam has an ultrasonic detection element receiving and transmitting the acoustic beam (not the guide wave but the ordinary ultrasonic wave). The Lam defect signal is detected by the reception time of the reflection wave reflected from the end by referring to the distance between the detection element and the end of the tubular member.

Consequently, all of the pending claims in the present application are believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to review and pass this application to issue.

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Respectfully submitted,

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